
Design and Analysis of the Drive Train of an All-Terrain Vehicle

Name of the students

1. Priyank Metha
(1115081, priyank.m@somaiya.edu)
2. Rohit Salgaonkar
(1115091, rohit.salgaonkar@somaiya.edu)
3. Soham Gokhale
(1115103, goksoham@gmail.com)

Project Guide

Prof. V. S. Narwane
(Dept. of Mechanical Engineering)

Abstract: Drivetrain basically concerns with conveying power from the vehicle's engine, through the transmission to the drive wheels on the vehicle to control the amount of torque. It comprises of the Engine, CVT (Continuously Variable Transmission), Gearbox, Differential, CV joints and Axle shafts. The ATVs are meant for operation on rough, off-road terrains which demand higher torque and a smooth transmission. The BAJA competition allows use of a standard 10Hp engine from which power transmission is to occur with appropriate torque conversion. An automatic transmission system through the use of a CVT has been incorporated due to its advantage of having smooth operation (infinite gear ratios), elimination of clutch, gear shifting and compactness over manual transmission. Also CVT tuning enables us to operate the engine at power peak so that power is transmitted most efficiently. A self-designed two stage reduction gearbox is coupled with the CVT to achieve the desired torques requirements for the terrain. An open differential is integrated with the gear train to provide aid in steering. The motion is further transferred from the gearbox to the wheel assembly through CV joints because of their ability to transmit torque through a higher range of suspension articulation. While designing and analysis emphasis is laid on, material selection, selection of proper FOS, method of production for gears and the gearbox so as to ensure longer life for the system, minimal transmission losses and also minimize the total cost of the system so that it can compete in the existing market. Also proper system layout has been ensured for ease in serviceability These features will create a vehicle that utilizes all of its power in a smooth, quick transition from rest to top speed, and insures minimal maintenance.

Keywords: Drive Train, Engine, Continuously Variable Transmission, Gearbox, Differential, CV joint, Torque, Serviceability
